Remarks

The Office Action mailed June 3, 2005, and made final, has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1, 2, 4-11, 13-17, 19-23, and 25-30 are now pending in this application. Claims 1, 2, 4-11, 13-17, and 19-21 are rejected. Claims 22, 23 and 25-30 are allowed.

The rejection of Claims 1, 2,4, 11, 13-17 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keuleman et al. ("Keuleman") (U.S. Patent No. 4,209,915) in view of Hikino et al. ("Hikino") (U.S. Patent No. 4,649,654) taken further with Clements (U.S. Patent No. 3,633,094) or Payne et al. ("Payne") (U.S. Patent No. 4,282,422) is respectfully traversed.

Keuleman describes a control arrangement for a clothes dryer. The clothes dryer includes a cabinet (1), a motor (M) connected to rotate a drying chamber (2), and a fan (3) for passing air through the chamber from an inlet (4) to an outlet (5). A heater (H) is positioned adjacent the inlet. A first temperature sensor (6) is located adjacent the outlet and a second temperature sensor (7) is located adjacent the inlet in air at ambient temperature, upstream of the fan and the heater. The heater includes two heating elements (H1) and (H2) which are controlled by heat regulating means (HRM) to maintain a predetermined temperature difference between the outlet and ambient air. A zero cross detector (OXP) is supplied that produces zero crossing pulses at each zero crossing of the alternating voltage source. The heat regulating means includes triacs (T1) and (T2) that receive the zero crossing pulses from the zero cross detectors. Heat monitoring means (HMM) are also responsive to the zero crossing pulses passed from the Triacs. The heat monitoring means is configured to provide a heating off signal (HO) which disables gates (G1) and (G2) in the triacs to turn off the heating elements.

Hikino describes a clothes dryer (1) including a door (2), a rotatable drum (3), a heater (5) and a heater casing (6). A motor (8) drives the drum and a fan (10) for taking in and

discharging air. A humidity sensor (16) and a thermostat (17) are positioned in an exhaust duct (15). A thermostat (18) is provided in the vicinity of the heater. The thermostats are arranged to break the heater circuit when an exhaust temperature and a heater temperature exceed predetermined values. The dryer includes a control unit (11) having a microcomputer (21) and control circuits including an overvoltage detecting circuit (23), a heater temperature detecting circuit (24), and a humidity detecting circuit (25). The humidity detecting circuit turns off the heater based on a detected resistance value in the humidity sensor and a selected drying mode. When the AC source voltage exceeds its rated value, the voltage detecting circuit sends a signal having a pulse width to the microcomputer which opens the heater circuit for a period of time corresponding to the pulse width of the received signal. The supply voltage is detected in the negative half of the supply voltage wave form.

Clements describes a burst length proportioning controller that includes a latching switch (11) which is operated to supply bursts of current from an AC power source (12) to a condition-controlling load (13) in a manner that tends to maintain the controlled condition at a predetermined set point.

Payne describes a power control system for controlling the power output to one or more resistive heating elements in response to an operator selected power level setting for an appliance such as a cooktop or hotplate. A control system (4) controls power applied to the heating elements by controlling the rate at which gate pulses applied to the gate terminals of triacs (3a)-(3d) in the heating circuits. The pulse repetition rates are varied between the lowest and highest power settings. A zero crossing detector generates a zero crossing pulse at each detected positive going zero crossing of the power signal.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. Obviousness cannot be established by merely suggesting that it would have been obvious to one of ordinary skill in the art to modify the teachings of Keuleman based on the teachings of Hikino, and Clements or Payne to produce the claimed invention

absent some motivation, suggestion, or incentive to do so. Keuleman teaches a control arrangement for clothes dryers wherein zero crossing in a power source is detected while maintaining a predetermined temperature difference between the dryer outlet and ambient air. Hikino is cited for teaching a dryer with a humidity and a thermostat. Clements is cited for teaching a burst length controller that senses temperature and humidity. Payne is cited for its teaching power control at zero crossings. None of Keuleman, Hikino, Clements, and Payne, considered alone or in combination, describe or suggest the claimed combinations of the present invention. Moreover, the mere sensing or monitoring of a temperature and humidity at some position associated with a dryer does not suggest the maintenance of the temperature/ humidity/ moisture relationships described in the recitations of the presently pending claims. Rather, the present Section 103 rejection appears to be based on an extrapolation of teachings particularly from Keuleman and Hikino in an attempt to arrive at the claimed invention. Since there is no teaching or suggestion in the cited art of the claimed combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, this is not impermissible, and for this reason alone, Applicants respectfully request that the Section 103 rejection of Claims 1, 2, 4-11, 13-17, and 19-21 be withdrawn.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. *Ex parte Levengood*, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicant's disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. *In re Vaeck*, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, no suggestion or motivation to modify the prior art disclosures, nor any reasonable expectation of success has been shown.

Claim 1 recites a method of limiting current, the method including "providing an AC sine wave to at least one heater element of an electric clothes dryer; stopping said providing at a zero

crossing of the AC sine wave; monitoring the AC sine wave for a subsequent zero crossing; reproviding the AC sine wave to the at least one heater element at the subsequent zero crossing, wherein said reproviding comprises reproviding the AC sine wave to the at least one heater element at a zero crossing more than two half cycles subsequent the zero crossing at which the AC sine wave was stopped; and monitoring a dryer inlet air temperature, a dryer outlet air temperature, a dryer outlet humidity, and a moisture level within the dryer drum to control said stopping and said reproviding to maintain one of a predetermined dryer inlet air temperature to dryer outlet humidity relationship, a predetermined dryer outlet air temperature to dryer outlet humidity relationship, a predetermined dryer inlet air temperature to drum moisture relationship, and a predetermined dryer outlet air temperature to drum moisture relationship".

None of Keuleman, Hikino, Clements, and Payne, considered alone or in combination, describe or suggest a method for limiting current as recited in Claim 1. More specifically, none of Keuleman, Hikino, Clements, and Payne, considered alone or in combination, describe or suggest a method for limiting current that includes monitoring a dryer inlet air temperature, a dryer outlet air temperature, a dryer outlet humidity, and a moisture level within the dryer drum to control the stopping and the reproviding steps to maintain one of a predetermined dryer inlet air temperature to dryer outlet humidity relationship, a predetermined dryer outlet air temperature to dryer outlet humidity relationship, a predetermined dryer inlet air temperature to drum moisture relationship, and a predetermined dryer outlet air temperature to drum moisture relationship. Rather, Keuleman describes a control arrangement that maintains a predetermined temperature difference between the outlet and ambient air. Hikino describes a control with control circuits directed to controlling a heater separately based on heater temperature, humidity and overvoltage conditions in the source voltage. Clements describes a controller that includes a latching switch which is operated to supply bursts of current from an AC power source to a condition-controlling load, and Payne describes a power control system for controlling the power output to one or more resistive heating elements in response to an operator selected power level setting for an appliance. Accordingly, Applicants respectfully submit that Claim 1 is patentable

over Keuleman in view of Hikino, and further in view of Clements or Payne.

Claims 4-6 depend from independent Claim 1. When the recitations of Claims 4-6 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 4-6 likewise are patentable over Keuleman in view of Hikino, and further in view of Clements or Payne.

Claim 2 recites a method of limiting current, the method including "providing an AC sine wave to at least one heater element of an electric clothes dryer; stopping said providing at a zero crossing of the AC sine wave; monitoring the AC sine wave for a subsequent zero crossing; reproviding the AC sine wave to the at least one heater element at the subsequent zero crossing, wherein said reproviding comprises reproviding the AC sine wave to the at least one heater element at a zero crossing immediately subsequent the zero crossing at which the AC sine wave was stopped; and monitoring a dryer inlet air temperature, a dryer outlet air temperature, a dryer outlet humidity, and a moisture level within the dryer drum to control said stopping and said reproviding to maintain one of a predetermined dryer inlet air temperature to dryer outlet humidity relationship, a predetermined dryer outlet air temperature to dryer outlet humidity relationship, a predetermined dryer inlet air temperature to drum moisture relationship, and a predetermined dryer outlet air temperature to drum moisture relationship".

None of Keuleman, Hikino, Clements, and Payne, considered alone or in combination, describe or suggest a method for limiting current as recited in Claim 2. More specifically, none of Keuleman, Hikino, Clements, and Payne, considered alone or in combination, describe or suggest a method for limiting current that includes monitoring a dryer inlet air temperature, a dryer outlet air temperature, a dryer outlet humidity, and a moisture level within the dryer drum to control the stopping and the reproviding steps to maintain one of a predetermined dryer inlet air temperature to dryer outlet humidity relationship, a predetermined dryer outlet air temperature to dryer outlet humidity relationship, a predetermined dryer inlet air temperature to drum moisture relationship, and a predetermined dryer outlet air temperature to drum moisture

relationship. Rather, Keuleman describes a control arrangement that maintains a predetermined temperature difference between the outlet and ambient air. Hikino describes a control with control circuits directed to controlling a heater separately based on heater temperature, humidity and overvoltage conditions in the source voltage. Clements describes a controller that includes a latching switch which is operated to supply bursts of current from an AC power source to a condition-controlling load, and Payne describes a power control system for controlling the power output to one or more resistive heating elements in response to an operator selected power level setting for an appliance. Accordingly, Applicants respectfully submit that Claim 2 is patentable over Keuleman in view of Hikino, and further in view of Clements or Payne.

Claims 7-9 depend from independent Claim 2. When the recitations of Claims 7-9 are considered in combination with the recitations of Claim 2, Applicants submit that dependent Claims 7-9 likewise are patentable over Keuleman in view of Hikino, and further in view of Clements or Payne.

Claim 10 recites an electric clothes dryer heater system including "a heater element; a dryer inlet air temperature sensor; a dryer outlet air temperature sensor; a dryer outlet humidity sensor; a dryer drum moisture sensor; a controller operationally coupled to said heater, said dryer inlet air temperature sensor, said dryer outlet air temperature sensor, said dryer outlet humidity sensor, and said dryer drum moisture sensor, said controller configured to: provide an AC sine wave to at least one heater element of an electric clothes dryer; stop said providing at a zero crossing of the AC sine wave; monitor the AC sine wave for a subsequent zero crossing; and reprovide the AC sine wave to the at least one heater element at the subsequent zero crossing, wherein to reprovide the AC sine wave to said at least one heater element, said controller configured to reprovide at a zero crossing more than two half cycles subsequent the zero crossing at which the AC sine wave was stopped; wherein said AC sine wave is stopped and reprovided to maintain one of a predetermined dryer inlet air temperature to dryer outlet humidity relationship, a predetermined dryer outlet air temperature to dryer outlet humidity relationship, a predetermined dryer inlet air temperature to drum moisture relationship, and a predetermined

dryer outlet air temperature to drum moisture relationship based on signals from said dryer inlet air temperature sensor, said dryer outlet air temperature sensor, said dryer outlet humidity sensor, and said dryer drum moisture sensor".

None of Keuleman, Hikino, Clements, and Payne, considered alone or in combination, describe or suggest a method for limiting current as recited in Claim 10. More specifically, none of Keuleman, Hikino, Clements, and Payne, considered alone or in combination, describe or suggest maintaining one of a predetermined dryer inlet air temperature to dryer outlet humidity relationship, a predetermined dryer outlet air temperature to dryer outlet humidity relationship, a predetermined dryer inlet air temperature to drum moisture relationship, and a predetermined dryer outlet air temperature to drum moisture relationship based on signals from a dryer inlet air temperature sensor, a dryer outlet air temperature sensor, a dryer outlet humidity sensor, and a dryer drum moisture sensor. Rather, Keuleman describes a control arrangement that maintains a predetermined temperature difference between the outlet and ambient air. Hikino describes a control with control circuits directed to controlling a heater separately based on heater temperature, humidity and overvoltage conditions in the source voltage. Clements describes a controller that includes a latching switch which is operated to supply bursts of current from an AC power source to a condition-controlling load, and Payne describes a power control system for controlling the power output to one or more resistive heating elements in response to an operator selected power level setting for an appliance. Accordingly, Applicants respectfully submit that Claim 10 is patentable over Keuleman in view of Hikino, and further in view of Clements or Payne.

Claims 13-15 depend from independent Claim 10. When the recitations of Claims 13-15 are considered in combination with the recitations of Claim 10, Applicants submit that dependent Claims 13-15 likewise are patentable over Keuleman in view of Hikino, and further in view of Clements or Payne.

Claim 11 recites an electric clothes dryer heater system including "a heater element; a

dryer inlet air temperature sensor; a dryer outlet air temperature sensor; a dryer outlet humidity sensor; a dryer drum moisture sensor; a controller operationally coupled to said heater, said dryer inlet air temperature sensor, said dryer outlet air temperature sensor, said dryer outlet humidity sensor, and said dryer drum moisture sensor, said controller configured to: provide an AC sine wave to at least one heater element of an electric clothes dryer; stop said providing at a zero crossing of the AC sine wave; monitor the AC sine wave for a subsequent zero crossing; and reprovide the AC sine wave to the at least one heater element at the subsequent zero crossing, wherein to reprovide the AC sine wave to said at least one heater element, said controller configured to reprovide at a zero crossing immediately subsequent the zero crossing at which the AC sine wave was stopped; wherein said AC sine wave is stopped and reprovided to maintain one of a predetermined dryer inlet air temperature to dryer outlet humidity relationship, a predetermined dryer outlet air temperature to dryer outlet humidity relationship, a predetermined dryer inlet air temperature to drum moisture relationship, and a predetermined dryer outlet air temperature to drum moisture relationship based on signals from said dryer inlet air temperature sensor, said dryer outlet air temperature sensor, said dryer outlet humidity sensor, and said dryer drum moisture sensor".

None of Keuleman, Hikino, Clements, and Payne, considered alone or in combination, describe or suggest a method for limiting current as recited in Claim 11. More specifically, none of Keuleman, Hikino, Clements, and Payne, considered alone or in combination, describe or suggest maintaining one of a predetermined dryer inlet air temperature to dryer outlet humidity relationship, a predetermined dryer outlet air temperature to dryer outlet humidity relationship, a predetermined dryer inlet air temperature to drum moisture relationship, and a predetermined dryer outlet air temperature to drum moisture relationship based on signals from a dryer inlet air temperature sensor, a dryer outlet air temperature sensor, a dryer outlet humidity sensor, and a dryer drum moisture sensor. Rather, Keuleman describes a control arrangement that maintains a predetermined temperature difference between the outlet and ambient air. Hikino describes a control with control circuits directed to controlling a heater separately based on heater

temperature, humidity and overvoltage conditions in the source voltage. Clements describes a controller that includes a latching switch which is operated to supply bursts of current from an AC power source to a condition-controlling load, and Payne describes a power control system for controlling the power output to one or more resistive heating elements in response to an operator selected power level setting for an appliance. Accordingly, Applicants respectfully submit that Claim 11 is patentable over Keuleman in view of Hikino, and further in view of Clements or Payne.

Claim 16 recites a dryer for tumble drying articles including "a drum comprising a cavity configured to hold articles to be dried; a motor drivingly coupled to said drum to rotate said drum; a heater element in flow communication with said cavity; a dryer inlet air temperature sensor; a dryer outlet air temperature sensor; a dryer outlet humidity sensor; a dryer drum moisture sensor; a blower positioned to deliver heated air to said cavity; and a controller operationally coupled to said heater, said dryer inlet air temperature sensor, said dryer outlet air temperature sensor, said dryer outlet humidity sensor, and said dryer drum moisture sensor, said controller configured to: provide an AC sine wave to at least one heater element of an electric clothes dryer; stop said providing at a zero crossing of the AC sine wave; monitor the AC sine wave for a subsequent zero crossing; and reprovide the AC sine wave to the at least one heater element at the subsequent zero crossing, wherein to reprovide the AC sine wave to said at least one heater element, said controller configured to reprovide at a zero crossing more than two half cycles subsequent the zero crossing at which the AC sine wave was stopped; wherein said AC sine wave is stopped and reprovided to maintain one of a predetermined dryer inlet air temperature to dryer outlet humidity relationship, a predetermined dryer outlet air temperature to dryer outlet humidity relationship, a predetermined dryer inlet air temperature to drum moisture relationship, and a predetermined dryer outlet air temperature to drum moisture relationship based on signals from said dryer inlet air temperature sensor, said dryer outlet air temperature sensor, said dryer outlet humidity sensor, and said dryer drum moisture sensor".

None of Keuleman, Hikino, Clements, and Payne, considered alone or in combination,

describe or suggest a method for limiting current as recited in Claim 16. More specifically, none of Keuleman, Hikino, Clements, and Payne, considered alone or in combination, describe or suggest maintaining one of a predetermined dryer inlet air temperature to dryer outlet humidity relationship, a predetermined dryer outlet air temperature to dryer outlet humidity relationship, a predetermined dryer inlet air temperature to drum moisture relationship, and a predetermined dryer outlet air temperature to drum moisture relationship based on signals from a dryer inlet air temperature sensor, a dryer outlet air temperature sensor, a dryer outlet humidity sensor, and a dryer drum moisture sensor. Rather, Keuleman describes a control arrangement that maintains a predetermined temperature difference between the outlet and ambient air. Hikino describes a control with control circuits directed to controlling a heater separately based on heater temperature, humidity and overvoltage conditions in the source voltage. Clements describes a controller that includes a latching switch which is operated to supply bursts of current from an AC power source to a condition-controlling load, and Payne describes a power control system for controlling the power output to one or more resistive heating elements in response to an operator selected power level setting for an appliance. Accordingly, Applicants respectfully submit that Claim 16 is patentable over Keuleman in view of Hikino, and further in view of Clements or Payne.

Claims 19-21 depend from independent Claim 16. When the recitations of Claims 19-21 are considered in combination with the recitations of Claim 16, Applicants submit that dependent Claims 19-21 likewise are patentable over Keuleman in view of Hikino, and further in view of Clements or Payne.

Claim 17 recites a dryer for tumble drying articles including "a drum comprising a cavity configured to hold articles to be dried; a motor drivingly coupled to said drum to rotate said drum; a heater element in flow communication with said cavity; a dryer inlet air temperature sensor; a dryer outlet air temperature sensor; a dryer outlet humidity sensor; a dryer drum moisture sensor; a blower positioned to deliver heated air to said cavity; and a controller operationally coupled to said heater, said dryer inlet air temperature sensor, said dryer outlet air

temperature sensor, said dryer outlet humidity sensor, and said dryer drum moisture sensor, said controller configured to: provide an AC sine wave to at least one heater element of an electric clothes dryer; stop said providing at a zero crossing of the AC sine wave; monitor the AC sine wave for a subsequent zero crossing; and reprovide the AC sine wave to the at least one heater element at the subsequent zero crossing, wherein to reprovide the AC sine wave to said at least one heater element, said controller configured to reprovide at a zero crossing immediately subsequent the zero crossing at which the AC sine wave was stopped; wherein said AC sine wave is stopped and reprovided to maintain one of a predetermined dryer inlet air temperature to dryer outlet humidity relationship, a predetermined dryer outlet air temperature to dryer outlet humidity relationship, a predetermined dryer inlet air temperature to drum moisture relationship, and a predetermined dryer outlet air temperature to drum moisture relationship based on signals from said dryer inlet air temperature sensor, said dryer outlet air temperature sensor, said dryer outlet humidity sensor, and said dryer drum moisture sensor".

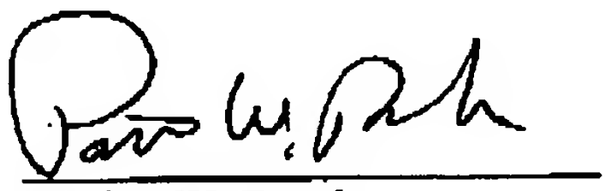
None of Keuleman, Hikino, Clements, and Payne, considered alone or in combination, describe or suggest a method for limiting current as recited in Claim 17. More specifically, none of Keuleman, Hikino, Clements, and Payne, considered alone or in combination, describe or suggest maintaining one of a predetermined dryer inlet air temperature to dryer outlet humidity relationship, a predetermined dryer outlet air temperature to dryer outlet humidity relationship, a predetermined dryer inlet air temperature to drum moisture relationship, and a predetermined dryer outlet air temperature to drum moisture relationship based on signals from a dryer inlet air temperature sensor, a dryer outlet air temperature sensor, a dryer outlet humidity sensor, and a dryer drum moisture sensor. Rather, Keuleman describes a control arrangement that maintains a predetermined temperature difference between the outlet and ambient air. Hikino describes a control with control circuits directed to controlling a heater separately based on heater temperature, humidity and overvoltage conditions in the source voltage. Clements describes a controller that includes a latching switch which is operated to supply bursts of current from an AC power source to a condition-controlling load, and Payne describes a power control system

for controlling the power output to one or more resistive heating elements in response to an operator selected power level setting for an appliance. Accordingly, Applicants respectfully submit that Claim 17 is patentable over Keuleman in view of Hikino, and further in view of Clements or Payne.

For at least the reasons set forth above, Applicants respectfully request that the 103 rejection of Claims 1, 2, 4-11, 13-17 and 19-21 be withdrawn.

In view of the foregoing remarks, this application is believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



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